

ABSTRACT OF THE DISCLOSURE

A method for enhancing the equilibrium solubility of boron and indium in silicon. The method involves first-principles quantum mechanical calculations to determine the temperature dependence of the equilibrium solubility of two important p-type dopants in silicon, namely boron and indium, under various strain conditions. The equilibrium thermodynamic solubility of size-mismatched impurities, such as boron and indium in silicon, can be raised significantly if the silicon substrate is strained appropriately. For example, for boron, a 1% compressive strain raises the equilibrium solubility by 100% at 1100°C; and for indium, a 1% tensile strain at 1100° C, corresponds to an enhancement of the solubility by 200%.